Complete Summary

TITLE

Postoperative sepsis: rate per 1,000 eligible admissions.

SOURCE(S)

AHRQ quality indicators. Pediatric quality indicators: technical specifications [version 3.2]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2008 Feb 29. various p.

McDonald K, Romano P, Davies S, Haberland C, Geppert J, Ku A, Choudhry K. Measures of pediatric health care quality based on hospital administrative data: the pediatric quality indicators. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2006 Sep. 130 p. [82 references]

Measure Domain

PRIMARY MEASURE DOMAIN

Outcome

The validity of measures depends on how they are built. By examining the key building blocks of a measure, you can assess its validity for your purpose. For more information, visit the Measure Validity page.

SECONDARY MEASURE DOMAIN

Does not apply to this measure

Brief Abstract

DESCRIPTION

This measure is used to assess the number of patients with sepsis per 1,000 eligible admissions with a length of stay of 4 days or more.

RATIONALE

This indicator is intended to flag cases of nosocomial postoperative sepsis. It is closely related to a complications indicator developed as part of the Complications Screening Program. In order to better screen out cases of sepsis that are likely to be present on admission, this indicator limits its definition of sepsis to secondary

diagnoses (meaning sepsis was not labeled as the principal diagnosis). High quality of care may reduce the risk for this complication.

PRIMARY CLINICAL COMPONENT

Postoperative sepsis

DENOMINATOR DESCRIPTION

All surgical discharges under age 18 defined by specific Diagnosis Related Groups (DRGs) and an International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) code for an operating room procedure

Exclude cases:

- with ICD-9-CM codes for sepsis in the principal diagnosis field
- with ICD-9-CM codes for infection in the principal diagnosis field
- Major Diagnostic Category (MDC) 14 (pregnancy, childbirth, and puerperium)
- with length of stay of less than 4 days
- neonates
- with DRG code in surgical class 4

Note: Refer to the original measure documentation for specific DRG and ICD-9-CM codes.

NUMERATOR DESCRIPTION

Discharges among cases meeting the inclusion and exclusion rules for the denominator with International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) code for sepsis in any secondary diagnosis field

Note: Refer to the original measure documentation for specific ICD-9-CM codes.

Evidence Supporting the Measure

EVIDENCE SUPPORTING THE CRITERION OF QUALITY

- A formal consensus procedure involving experts in relevant clinical, methodological, and organizational sciences
- One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

Evidence Supporting Need for the Measure

NEED FOR THE MEASURE

Variation in quality for the performance measured

EVIDENCE SUPPORTING NEED FOR THE MEASURE

Agency for Healthcare Research and Quality (AHRQ). National healthcare quality report. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2003.

Miller MR, Zhan C. Pediatric patient safety in hospitals: a national picture in 2000. Pediatrics2004 Jun;113(6):1741-6. [32 references] PubMed

State of Use of the Measure

STATE OF USE

Current routine use

CURRENT USE

Internal quality improvement
Quality of care research

Application of Measure in its Current Use

CARE SETTING

Hospitals

PROFESSIONALS RESPONSIBLE FOR HEALTH CARE

Advanced Practice Nurses
Allied Health Personnel
Nurses
Physicians

LOWEST LEVEL OF HEALTH CARE DELIVERY ADDRESSED

Single Health Care Delivery Organizations

TARGET POPULATION AGE

Age less than 18 years

TARGET POPULATION GENDER

Either male or female

STRATIFICATION BY VULNERABLE POPULATIONS

Stratify by risk group:

i. High risk: Immunodeficient patients (HIV, AIDs, immune system disorders, transplant, short bowel syndrome, specified leukemias and lymphomas, renal failure and severe malnutrition)
ii. Intermediate risk: Lupus, renal disease and other rare autoimmune, hepatic failure, cachexia, spleen disorders
iii. Low risk: All other patients

Characteristics of the Primary Clinical Component

INCIDENCE/PREVALENCE

The incidence of post-operative sepsis, using the original Agency for Healthcare Research and Quality (AHRQ) Patient Safety Indicators (PSI) definition, was investigated in pediatric populations (e.g., 3.87 per 1,000 discharges at 0 to 17 years, 3.71 at 18 to 44 years, 9.08 at 45 to 64 years, and 11.16 at 65 or more years). Other groups have analyzed rates of this indicator using the publicly available indicator definition applied to a pediatric population; this definition differs slightly from the definition proposed for this measure. Using Healthcare Cost and Utilization Project (HCUP) data from 2000, a rate of 10.3 per 1,000 discharges was seen for the complication of postoperative sepsis in pediatric patients 0 to 18 years of age. Additionally, it was found that this complication resulted in an increased mean length of stay (by 26 days) and $117,815 in increased charges in affected patients, with 11 times higher odds of in-hospital mortality (after adjusting for age, gender, expected payer, up to 30 comorbidities, and multiple hospital characteristics, including ownership, teaching status, nursing expertise, urban location, bed size, pediatric volume, coding intensity, intensive care unit (ICU) bed percentage, and surgical discharge percentage).

EVIDENCE FOR INCIDENCE/PREVALENCE

Agency for Healthcare Research and Quality (AHRQ). National healthcare quality report. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2003.

Miller MR, Zhan C. Pediatric patient safety in hospitals: a national picture in 2000. Pediatrics2004 Jun;113(6):1741-6. [32 references] PubMed

ASSOCIATION WITH VULNERABLE POPULATIONS

As in adult surgery, post-operative sepsis is a potential complication in pediatric surgery.

See the "Incidence/Prevalence" field.

EVIDENCE FOR ASSOCIATION WITH VULNERABLE POPULATIONS

McDonald K, Romano P, Davies S, Haberland C, Geppert J, Ku A, Choudhry K. Measures of pediatric health care quality based on hospital administrative data: the pediatric quality indicators. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2006 Sep. 130 p. [82 references]

BURDEN OF ILLNESS

See the "Incidence/Prevalence" field.

UTILIZATION

See the "Incidence/Prevalence" field.

COSTS

See the "Incidence/Prevalence" field.

Institute of Medicine National Healthcare Quality Report Categories

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness
Safety

Data Collection for the Measure

CASE FINDING

Users of care only

DESCRIPTION OF CASE FINDING

All surgical discharges under age 18 defined by specific Diagnosis Related Groups (DRGs) and an International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) code for an operating room procedure (see the "Denominator Inclusions/Exclusions" field)

DENOMINATOR SAMPLING FRAME

Patients associated with provider

DENOMINATOR INCLUSIONS/EXCLUSIONS

Inclusions
All surgical discharges under age 18 defined by specific Diagnosis Related Groups (DRGs) and an International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) code for an operating room procedure

Exclusions
Exclude cases:

- with ICD-9-CM codes for sepsis in the principal diagnosis field
- with ICD-9-CM codes for infection in the principal diagnosis field
- Major Diagnostic Category (MDC) 14 (pregnancy, childbirth, and puerperium)
- with length of stay of less than 4 days
- neonates
- with DRG code in surgical class 4

Note: Refer to the original measure documentation for specific DRG and ICD-9-CM codes.

RELATIONSHIP OF DENOMINATOR TO NUMERATOR

All cases in the denominator are equally eligible to appear in the numerator

DENOMINATOR (INDEX) EVENT

Clinical Condition
Institutionalization
Therapeutic Intervention

DENOMINATOR TIME WINDOW

Time window is a single point in time

NUMERATOR INCLUSIONS/EXCLUSIONS

Inclusions

Discharges among cases meeting the inclusion and exclusion rules for the denominator with International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) code for sepsis in any secondary diagnosis field

Note: Refer to the original measure documentation for specific ICD-9-CM codes.

Exclusions

Unspecified

MEASURE RESULTS UNDER CONTROL OF HEALTH CARE PROFESSIONALS, ORGANIZATIONS AND/OR POLICYMAKERS

The measure results are somewhat or substantially under the control of the health care professionals, organizations and/or policymakers to whom the measure applies.

NUMERATOR TIME WINDOW

Institutionalization

DATA SOURCE

Administrative data

LEVEL OF DETERMINATION OF QUALITY

Not Individual Case

OUTCOME TYPE

Adverse Outcome

PRE-EXISTING INSTRUMENT USED

Unspecified

Computation of the Measure

SCORING

Rate

INTERPRETATION OF SCORE

Better quality is associated with a lower score

ALLOWANCE FOR PATIENT FACTORS

Analysis by high-risk subgroup (stratification on vulnerable populations)
Analysis by subgroup (stratification on patient factors, geographic factors, etc.)
Case-mix adjustment
Risk adjustment method widely or commercially available

DESCRIPTION OF ALLOWANCE FOR PATIENT FACTORS

Risk adjustment of the data is recommended using, at minimum, birthweight, age in days, age and AHRQ Clinical Classification Software*.

Application of multivariate signal extraction (MSX) to smooth risk adjusted rates is also recommended.

Specifically, for this measure:

Stratify by risk group:

i. High risk: Immunodeficient patients (HIV, AIDs, immune system disorders, transplant, short bowel syndrome, specified leukemias and lymphomas, renal failure and severe malnutrition)
ii. Intermediate risk: Lupus, renal disease and other rare autoimmune, hepatic failure, cachexia, spleen disorders
iii. Low risk: All other patients

*__Note__: Information on the Clinical Classification Software (CCS) for ICD-9-CM is available at http://hcup-us.ahrq.gov/toolssoftware/ccs/ccs.jsp.

STANDARD OF COMPARISON

Internal time comparison

Evaluation of Measure Properties

EXTENT OF MEASURE TESTING

The development of the Agency for Healthcare Research and Quality (AHRQ) Pediatric Quality Indicators utilizes a four pronged approach: identification of candidate indicators, literature review, empirical analyses, and panel review. Candidate indicators were identified through both published literature and a brief survey of national organizations. Literature review provided descriptions and evaluations of some candidate indicators and the underlying relationship to quality of care. Empirical analyses were conducted to explore alternative definitions; to assess nationwide rates and hospital variation; and to develop appropriate methods to account for variation in risk. Clinical panel review helped to refine indicator definitions and risk groupings, and to establish face validity in light of the limited evidence from the literature for most pediatric indicators. Information from these sources was used to specify indicator definitions and make recommendations to AHRQ regarding the best indicators for inclusion in the pediatric indicator set.

A structured review of each indicator was undertaken to evaluate face validity (from a clinical perspective). This process mirrored that undertaken during the initial development of the Patient Safety Indicators. Specifically, the panel approach established *consensual validity*, which "extends face validity from one expert to a panel of experts who examine and rate the appropriateness of each item...." The methodology for the structured review was adapted from the RAND/UCLA Appropriateness Method and consisted of an initial independent assessment of each indicator by clinician panelists using an initial questionnaire, a conference call among all panelists, followed by a final independent assessment by clinician panelists using the same questionnaire. The panel process served to refine definitions of some indicators, add new measures, and dismiss indicators with major concerns from further consideration.

Empirical analyses were conducted to provide the clinical panels and peer review participants with additional information about the indicators. These analyses were also used by the development team to test the alternative specifications and the relative contribution of indicator components in the numerator and denominator. These analyses were not intended to inform issues of precision, bias and construct validity, which will be addressed separately. The data source used in the empirical analyses was the 2003 Kids' Inpatient Sample (KID).

Refer to the original measure documentation for additional details.

EVIDENCE FOR RELIABILITY/VALIDITY TESTING

Fitch K, Bernstein SJ, Aguilar MD, et al. The RAND/UCLA appropriateness method user's manual. Santa Monica (CA): RAND; 2001. 109 p.

Green L, Lewis F. Measurement and evaluation in health education and health promotion. Mountain View (CA): Mayfield Publishing Company; 1998.

McDonald K, Romano P, Davies S, Haberland C, Geppert J, Ku A, Choudhry K. Measures of pediatric health care quality based on hospital administrative data: the pediatric quality indicators. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2006 Sep. 130 p. [82 references]

Identifying Information

ORIGINAL TITLE

Postoperative sepsis (PDI 10).

MEASURE COLLECTION

Agency for Healthcare Research and Quality (AHRQ) Quality Indicators

MEASURE SET NAME

Agency for Healthcare Research and Quality (AHRQ) Pediatric Quality Indicators

DEVELOPER

Agency for Healthcare Research and Quality

ADAPTATION

This measure was adapted from the AHRQ Patient Safety Quality Indicators.

PARENT MEASURE

Postoperative Sepsis (PSI 13) (Agency for Healthcare Research and Quality [AHRQ])

RELEASE DATE

2006 Feb

REVISION DATE

2008 Feb

MEASURE STATUS

This is the current release of the measure.

SOURCE(S)

AHRQ quality indicators. Pediatric quality indicators: technical specifications [version 3.2]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2008 Feb 29. various p.

McDonald K, Romano P, Davies S, Haberland C, Geppert J, Ku A, Choudhry K. Measures of pediatric health care quality based on hospital administrative data: the pediatric quality indicators. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2006 Sep. 130 p. [82 references]

MEASURE AVAILABILITY

The individual measure, "Postoperative Sepsis (PDI 10)," is published in "Measures of Pediatric Health Care Quality Based on Hospital Administrative Data: The Pediatric Quality Indicators" and "AHRQ Quality Indicators. Pediatric Quality Indicators: Technical Specifications [version 3.2]." These documents are available in Portable Document Format (PDF) from the Pediatric Quality Indicators Download page at the Agency for Healthcare Research and Quality (AHRQ) Quality Indicators Web site.

For more information, please contact the QI Support Team at support@qualityindicators.ahrq.gov.

COMPANION DOCUMENTS

The following are available:

- AHRQ quality indicators. Pediatric quality indicators: software documentation [version 3.2] - SAS. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2008 Mar 10. 40 p. This document is available in Portable Document Format (PDF) from the AHRQ Quality Indicators Web site.
- AHRQ quality indicators. Software documentation: Windows [version 3.1a]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2007 Apr 6. 99 p. This document is available in PDF from the AHRQ Quality Indicators Web site.
- Pediatric quality indicators (PedQI): covariates [version 3.1]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2007 Mar 12. 52 p. This document is available in PDF from the AHRQ Quality Indicators Web site.
- Pediatric quality indicators (PedQI): covariates (with POA) [version 3.1]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2007 Mar 12. 52 p. This document is available in PDF from the AHRQ Quality Indicators Web site.
- HCUPnet. [internet]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2004 [accessed 2007 May 21]. [Various pagings]. HCUPnet is available from the AHRQ Web site. See the related QualityTools summary.

NQMC STATUS

This NQMC summary was completed by ECRI Institute on December 28, 2007. The information was verified by the measure developer on March 31, 2008.

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